

## SCIENCE, PHILOSOPHY, AND THE RETURN OF TIME: REFLECTIONS ON SPECULATIVE THOUGHT

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**ABSTRACT:** My paper is conceived as a critical contribution to this growing literature, intended to clarify certain problematic controversies in the philosophy of nature. In particular, I will analyze the ontological project Roberto Unger and Lee Smolin who have developed the most systematic philosophy in the continental tradition, and who draw on mathematics and science as a source of philosophical inspiration. While I admire the philosophy of nature developed by Unger and Smolin, this paper will argue that their project has not been entirely successful. I will conclude by suggesting that Schelling offers more valuable philosophical resources to develop a cogent philosophy of nature.

**KEYWORDS:** Time; Natural Philosophy; Schelling; Roberto Unger; Lee Smolin

### INTRODUCTION: RENEWED INTEREST IN THE PHILOSOPHY OF NATURE

The new millennium has been marked by a return to systematic ambition in philosophy. As is well known, the latter half of the 20<sup>th</sup> century was marked by the development of numerous skeptical philosophies,<sup>1</sup> both in the continental and analytical traditions.<sup>2</sup>

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<sup>1</sup> Following Badiou, I will characterize these as various iterations of democratic materialism. See Alain Badiou. *Logics of Worlds: Being and Event II*, trans. Alberto Toscano. (London: Continuum, 2009), 1.

<sup>2</sup> Richard Rorty being a paradigmatic representative. See Richard Rorty. *Philosophy and the Mirror of Nature*. (New Jersey: Princeton Paperback, 1979). In the realm of political philosophy, this same gesture was repeated in the turn from the metaphysical to the political carried out, ironically, by the most systematic philosopher John Rawls. See John Rawls. *Political Liberalism: With A New Introduction and the Reply to Habermas*. (New York: Columbia University Press, 1993)

However, a growing number of serious thinkers<sup>3</sup> chose to eschew the skepticism of post-modern democratic materialism and once more engage in rigorous system building and metaphysical speculation. Intriguingly, many of these thinkers have bucked continental philosophy's traditional focus on the humanities as a source of inspiration, and begun to take seriously the questions posed by developments in the sciences and mathematics.<sup>4</sup>

My paper is conceived as a critical contribution to this growing literature, intended to clarify certain problematic controversies in the philosophy of nature. In particular, I will analyze the proposal Roberto Unger and Lee Smolin,<sup>5</sup> who have developed the most systematic philosophy of nature in some time, and who draw heavily on physics as a source of philosophical inspiration.

While there is much to admire in their philosophy of nature, this paper will argue that Unger and Smolin's have not developed an entirely successful philosophy of nature. I believe that the reason their project is not entirely successful lies in how Unger and Smolin interpret mathematics, especially the infinite. Roberto Unger and Lee Smolin rightly demand that a philosophy of nature make empirically testable claims which can be checked against referents in the physical sciences. It is only through such a genuinely scientific process that a continental ontology can assume the rigour and plausibility required to warrant widespread acceptance. However, I argue that Unger and Smolin are too quick to turn to a heuristic account of the infinite, and indeed mathematics as a whole. Their project advances too fundamentally anti-Platonic an agenda. They do not recognize how a rigorous mathematical concept of the infinite is necessary if we are to understand complex phenomena such as consciousness and if we are to think through philosophically perplexing features of nature.<sup>6</sup>

In the concluding sections, I will briefly offer some constructive remarks about how these limitations in Smolin and Unger's project can be overcome. Specifically, I will

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<sup>3</sup> Slavoj Žižek, Giorgio Agamben, Simon Critchley, and Badiou himself are just a few examples.

<sup>4</sup> An exhaustive list would be impossible. I can mention the work of Peter Sloterdijk, who draws heavily on the history of biology, and Quentin Meillassoux, who has followed Badiou in being heavily inspired by mathematics, as just two prominent examples.

<sup>5</sup> I am primarily drawing upon their joint manuscript. See Roberto Unger and Lee Smolin. *The Singular Universe and the Reality of Time: A Proposal in Natural Philosophy*. (United Kingdom: Cambridge University Press, 2014). I will also draw upon each author's additional writings where doing so might provide exegetical or comparative insight.

<sup>6</sup> Interestingly, I believe that Unger has strayed from some of his original insights about how consciousness itself can be understood as a kind of infinite structure. I shall not engage this issue in any depth here. But the reader is encouraged to look at Roberto Unger. *Passion: An Essay on Personality*. (London: The Free Press, 1986)

argue that the early Schelling offers<sup>7</sup> many philosophical resources to develop a modern and robust philosophy of nature.<sup>8</sup> I will therefore conclude this paper with a few preparatory remarks towards adopting a Schellingian approach to the philosophy of nature; albeit one that deviates from Schelling in several important respects.

## Part I

### ROBERTO UNGER AND LEE SMOLIN ON THE EVOLUTION OF LAWS AND THE REALITY OF TIME

In this section I will outline the proposal of Roberto Unger and Lee Smolin as presented in their opus- *The Singular Universe and the Reality of Time: A Proposal in Natural Philosophy*. For the sake of edification, I will occasionally refer to their other published works. But the primary focus will always be on their most recent text, as it presents the mature articulation of their overall proposal.

Given the unprecedented nature of such an intense collaboration between a founding figure of the critical legal studies movement and a renowned physicist, it is worth briefly noting some autobiographical and intellectual parallels between the two authors. Roberto Unger began his career as an especially sharp critic of liberal legalism<sup>9</sup>, before moving on to engage questions in social theory,<sup>10</sup> psychology,<sup>11</sup> philosophy,<sup>12</sup> politics,<sup>13</sup> and even religion. In between he has also been active politically, as Minister of Strategic Affairs in Brazil between 2007-2009 and again starting in 2015. Lee Smolin

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<sup>7</sup> This is with the qualification that many of Schelling's now dated comments on the science of his day are to be discarded. I am interested only in his philosophy and how to apply it to contemporary issues.

<sup>8</sup> I will largely be drawing on F.W.J Schelling. *System of Transcendental Idealism*, trans. Peter Heath. (United States: University of Virginia Press, 2001) and F.W.J Schelling. *First Outline of a System of the Philosophy of Nature*, trans. Keith R. Peterson. (New York: SUNY Press, 2004)

<sup>9</sup> See Roberto Mangabeira Unger. *Knowledge and Politics*. (New York: The Free Press, 1975) and Roberto Mangabeira Unger. *The Critical Legal Studies Movement*. (Cambridge: Harvard University Press, 1983)

<sup>10</sup> See Roberto Mangabeira Unger. *Politics Volume One: False Necessity-Anti-Necessitarian Social Theory in the Service of Radical Democracy*. (London: Verso Books, 2004) and its companion volumes Roberto Mangabeira Unger. *Politics Volume Two: Social Theory-Its Situation and its Task*. (London: Verso Books, 2004) and Roberto Mangabeira Unger. *Politics Volume Three: Plasticity Into Power-Comparative Historical Studies on the Institutional Conditions of Economic and Military Success*. (London: Verso Books, 2004)

<sup>11</sup> See Unger, *Passion*

<sup>12</sup> See Roberto Mangabeira Unger. *The Self Awakened: Pragmatism Unbound*. (Cambridge: Harvard University Press, 2009)

<sup>13</sup> See Roberto Mangabeira Unger. *What Should the Left Propose?* (London: Verso Books, 2005)

received his PhD in theoretical physics from Harvard in 1979 and now works at the Perimeter Institute at the University of Waterloo and in the Department of Philosophy at the University of Toronto. His early (and current) work focused on developing a theory of loop quantum gravity.<sup>14</sup> In recent years, he has argued independently and in conjunction with Unger that physicists must abandon the influence of Platonism, particularly when understanding how physical law emerges, if we are to be better comprehend time itself.<sup>15</sup>

While there might superficially appear to be little in common between the two figures, in fact both authors seem to have recognized the general trend towards an anti-necessitarian metaphysics in the other's work. Unger was inspired early on to reject the mechanical determinism he perceived at the heart of both liberal legalism,<sup>16</sup> with its techniques to arrive at a correct application of rules to a contextualized subject, and Marxism, which in its classical formulations maintained that the emergent features of a given social form could be understood by grasping the eternally<sup>17</sup> operative laws of a materialist dialectic.<sup>18</sup> This belief gradually evolved from guiding his approach to classical social theory into an entire philosophy.<sup>19</sup> By contrast, Smolin began his career enamoured with the classical myth that the task of physics was conceptualizing and unifying the eternal laws of nature. Later, under the influence of Darwinian theory, his own dissatisfaction with the incompleteness of the contemporary field, and a growing conviction that physicists were unduly influenced by Platonizing aesthetics,<sup>20</sup> Smolin abandoned this conceit.<sup>21</sup> Mutually influenced by each others' work, Unger and Smolin collaborated to write amongst the most important and interesting proposals to emerge

<sup>14</sup>See Lee Smolin. *Three Roads to Quantum Gravity: With a New Postscript by the Author*. (Great Britain: Basic Books, 2000)

<sup>15</sup> Lee Smolin. *Time Reborn: From the Crisis in Physics to the Future of the Universe*. (Toronto: Vintage Canada, 2013)

<sup>16</sup> See Unger, *Knowledge and Politics*, 69-72 and Unger, *The Critical Legal Studies Movement*, 5-14

<sup>17</sup> Unger's characterization of Marx is as a classical social theorist of the highest calibre, concerned with understanding the formation and decay of societies both in their particularity and in general. He is not deeply concerned with Marx as the prophet of communism. While Unger does occasionally address the controversial Utopianism in Marx's vision of a post-historical society, it is not essential to his interpretation of the man or the tradition he founded.

<sup>18</sup> See Unger, *Politics Volume One*.

<sup>19</sup> See Unger, *The Self Awakened*

<sup>20</sup> Smolin's criticism of aesthetically minded approaches to science has been developed over a long period. See his comments about "the power of mathematical beauty" in Lee Smolin. *The Trouble with Physics: The Rise of String Theory, the Fall of a Science, and What Comes Next*. (New York: Mariner, 2006), 45.

<sup>21</sup> See Smolin, *Time Reborn*, XI-XIX

from “natural philosophy” in some time.

While *The Singular Universe* makes any number of complex arguments, the basic claims are very clear. Unger and Smolin believe that physics has been stultified by its commitment to certain basic myths which are taken as methodological and even metaphysical necessities. Amongst the most important of these is the belief that time is fundamentally an illusory, or at best purely subjective,<sup>22</sup> feature of the universe. This belief persists in part because many physicists ontologically privilege the eternal “laws” of physics over the various instantiations of those laws seen in the activity of physical objects.

By contrast, Unger and Smolin argue that physics can shift from being a calcified discipline engaged in Platonic mysticism<sup>23</sup> by dealing more substantially with foundational issues that can only be resolved through the combined resources of science and speculative philosophy. One of the reasons given for their collaboration is to rejuvenate the long-buried discipline of “natural philosophy” by engaging in metaphysical speculation on the natural world. To do so, the physicist must pragmatically engage in process of reflecting upon empirical data presented and checking it against the most reliable metaphysical proposals available.<sup>24</sup> This process helps one reach an equilibrium between metaphysics and empirical facts, and thence engage in sophisticated and empirically rigorous speculation about the most basic characteristics of the nature. Their speculations lead Unger and Smolin to several dramatic conclusions. The most notable of these is that time is real, rather than an illusion experienced by finite beings in one part of the universe. The second is a rejection of the multiple universes hypothesis that they argue became fashionable as a result of physicists privileging their mathematical models over empirical observations. To Unger and Smolin, the universe we inhabit is the only one that is existent at any given moment in time.<sup>25</sup>

My purpose here is not to deconstruct each of the varied and complex physical

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<sup>22</sup> Though as I shall argue, neither Unger or Smolin account substantially for the cognitive problems posed by time. This is strange given that these issues were acknowledged as far back as Kant and arguably earlier. See Immanuel Kant. *Critique of Pure Reason*, ed. Vasilis Politis. (London: Everyman Library, 1993) and Immanuel Kant. *Prolegomena to Any Future Metaphysics*, ed. Lewis White Beck. (United States: Bobbs-Merill, 1950) It is also a problem acknowledged and dealt with more thoroughly by other physicists. For an instructive example see Roger Penrose. *The Emperor's New Mind*. (England: Oxford Paperbacks, 1999).

<sup>23</sup> See Smolin, *Time Reborn*, 34

<sup>24</sup> See Unger and Smolin, *The Singular Universe*, 48

<sup>25</sup> See Unger and Smolin, *The Singular Universe*, 100-140 and 414

arguments given by Unger and Smolin for their all positions. Nor will I engage significantly with their arguments for the singular universe and against its pluralistic alternatives.<sup>26</sup> I will only touch on them to the extent their claims can be related to Unger and Smolin's specific arguments for reducing the role of mathematics in physics. This is because my primary issue with Unger and Smolin is not the physical picture they draw of the universe. Instead, it is their treatment of mathematics, and the infinite especially, that I wish to take issue with.

Unger and Smolin believe that mathematical Platonism, through the work of Aristotle, Newton, and even Einstein,<sup>27</sup> has far too long provided an aesthetic and methodological model for physics. Platonism established a deific image of a timeless world of mathematical forms which has been appropriated by physics and updated into a belief in the eternal status of the laws of nature. What occurs in the natural world of experience is only of contingent interest, whereas the operation of eternal and necessary<sup>28</sup> laws are of primary importance to the physicist. This leads many physicists, for instance Roger Penrose,<sup>29</sup> to ascribe allegedly eternal physical laws a Platonic status, and to grant the mathematical models depicting them a consequent ontological priority.<sup>30</sup>

By contrast, Unger and Smolin believe that we should look less at mathematics, and more to evolutionary biology and social theory as models both for how to do physics and for insight into how the actual universe works.<sup>31</sup> These disciplines teach us that we must cease believing in the "false necessity" of eternal laws, and instead see the natural world of physics as analogous to the world of macro-organisms and human beings. In these latter contexts, one sees no Platonic or teleological laws operating eternally. Instead the

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<sup>26</sup> By contrast, we are forced to deal with their claims about the reality of time because they are central to the argument against the ontological status of mathematics.

<sup>27</sup> Saying this, Smolin is emphatic that a consistent application of Einsteinian logic would lead to the conclusions he argues for. See Smolin, *Time Reborn*.

<sup>28</sup> This point is especially important for Unger, who has wrestled with the concept of necessity throughout his academic work. Despite this sustained engagement, as we shall see, the idea that a law could be eternal and contingent isn't addressed by either author in *The Singular Universe*.

<sup>29</sup> See Roger Penrose. *The Road to Reality: A Complete Guide to the Laws of the Universe*. (London: Vintage Books, 2006), 12-16. Penrose's own ontology is somewhat vague. He distinguishes between physical objects, mental objects, and Platonic objects, all of which engage in mutually constitutive relationships. Whether there is any traction in this solution is a problem I leave aside.

<sup>30</sup> Interestingly, this gesture is comparable to the return to mathematics undertaken by Alain Badiou, though he has never engaged contemporary physics thoroughly enough to note this connection.

<sup>31</sup> See Unger and Smolin, *The Singular Universe*, 323-324

so-called laws of nature themselves-like organisms and humans-change through an evolutionary process of natural selection wherein those that are best adapted to the physical contexts within which they emerge.

This suggests two important points. The first is that the universe, as we experience it, is the product of relational and contingent processes which lead to probabilistic outcomes. Resultantly, the ontology of the universe, and indeed everything within it, is not a necessary outcome of eternal laws operating within what finite subjects experience as space-time.<sup>32</sup> Secondly, Unger and Smolin propose that their natural philosophy suggests that time truly exists. Unger and Newton argue that their predecessors were prone to devaluing time. On their reading, Newton felt that time was simply a phenomena experienced by finite beings within the mind of God, while Einstein believed it was a phenomena experienced by individuals moving within a relative worldline.<sup>33</sup> Unger and Smolin believe these figures were attracted to this position because both Newton and Einstein believed that the universe must operate according to necessary, deterministic laws.<sup>34</sup> This implied that time was an illusion, albeit an important one, since the appearance of change and transformation was undercut by the fact that everything was determined by natural law from the outset. By contrast, Unger and Smolin argue that natural laws are better understood as contingent and constantly evolving. This suggests that time does exist and is open ended. Since the laws of nature are contingent, rather than necessary, the future remains undetermined.<sup>35</sup>

Their argument that the universe evolves through contingent processes wherein laws emerge and disappear, along with the consequent argument that time exists, leads in to

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<sup>32</sup> See Unger and Smolin, *The Singular Universe*, 367-372

<sup>33</sup> Unger and Smolin argue that these arguments constitute the spatialization of time. It transforms time from an independent variable into one that can only be understood through the geometry of space-time. This naturally inclines physicists to understand time according to the spatial qualities associated with geometry since the days of Euclid.

<sup>34</sup> See Unger and Smolin, *The Singular Universe*, 32-45

<sup>35</sup> Notably, both Unger and Smolin believe that this has significant ramifications for our understanding of human agency and the human sciences. For instance, they apply their model to the “science” of economics to maintain the most economists are wrong to see the market as operating according to certain timeless laws which, under ideal conditions, would lead to a welfare maximizing equilibrium. The consequence of this has been to argue that we should interfere in the economy as little as possible. Unger and Smolin both reject this position as unduly beholden to classical physics as a model for how to do science. Appeal to the false necessity of so called “laws” of path-dependent economics leads many to reject any belief that we can fundamentally change the socio-historical contexts within which we exist. Unfortunately, most of these insights are sporadically developed and the connection between a “natural philosophy” and an ethics and/or politics ambiguous. The most insightful remarks have been on how physics has served as a model for sciences, including economics.

Unger and Smolin's arguments that physicists should reject the authority typically ascribed to mathematics.<sup>36</sup> This prioritization leads physicists to strip the flesh and blood from real occurrences. Indeed, Unger and Smolin believe that physicists engage in a fundamentally paradoxical activity by using the seemingly timeless laws of mathematics to describe the occurrences of the actual world as it exists and operates within time. This was nicely captured by Leopold Kronecker's claim that, "God created the integers. All the rest is the work of Man."<sup>37</sup>

Unger and Smolin emphatically reject this conception of mathematics being either transcendent or *a priori* to the experience acquired through engaging in everyday physics, and rigorous experimentation. As nicely summarized by Unger, in his brief paper on the topic:

"The distinctiveness of the mathematical perspective -- its evisceration of particularity and its suppression of time -- helps explain the power of mathematics to illuminate a universe in which time holds sway and particularity is everywhere. This power, nevertheless, perpetually subjects us to a twofold risk. The first risk is to mistake the mathematical representation of a slice of the one real world -- the slice that has to do with bundles of relations and with structured wholes -- for privileged, indubitable insight into a separate, nature-transcending realm of mathematical truths. There is no such realm, any more than there is a multitude of unobservable universes (now commonly called the multiverse) whose existence we postulate only because they fill the otherwise empty boxes of a mathematical conception, disguised as a physical theory. The second risk is that we allow ourselves to be lulled by the effectiveness and beauty of our mathematical propositions into the belief that nature shares in their timelessness. It would do so, most convincingly, by operating under the force of eternal laws and symmetries. Such regularities achieve adequate expression only when they can be represented mathematically. Their susceptibility to mathematical representation confirms, according to this illusion, their claim to participate in the freedom of mathematics from time. It does not. To believe that it does is to spoil the gift of mathematics to

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<sup>36</sup> Part of this stems from their fundamental materialism. Unger and Smolin do not give particularly strong epistemological reasons for rejecting cognitivist theories in favor of materialism. But there is no doubt that their belief in the latter, with the associated realism about the natural world, contributes to Unger and Smolin reject arguments for both Platonism and other, more skeptical philosophies, that believe that mathematical models of the world are simply the best hook to reality that we have. Unger calls these philosophies the two "families of ideas" in our philosophical understanding of mathematics. See Roberto Mangabeira Unger. "A Mystery Demystified: The Connection Between Mathematics and Physics" [http://robertounger.com/english/pdfs/MATHEMATICS\\_AND\\_PHYSICS1.pdf](http://robertounger.com/english/pdfs/MATHEMATICS_AND_PHYSICS1.pdf)

<sup>37</sup> See Stephen Hawking. *God Created the Integers: The Mathematical Breakthroughs that Changed History*. (Philadelphia: Running Press, 2007), 1058-1059.



physics.”<sup>38</sup>

Unger and Smolin argue that physicists should instead adopt a pragmatic approach to mathematics and its relationship to physical phenomena. Maths should be considered a useful tool, but not one that occupies pride of place, let alone being accorded ontological significance. They regard this as both a methodological and ethical advance on previous, Platonically oriented positions. When, “language is the language” of physics,<sup>39</sup> it would enable individuals to engage more creatively and inclusively with the topic. It would also enable other voices, such as those of philosophers and even laymen, to join in the conversation about the most basic questions about the universe. To this point, Smolin himself recounts that he was initially “seduced” to the discipline of physics in part because of the supreme elegance and simplicity of Einstein’s writing.<sup>40</sup>

#### THE INFINITE IN UNGER AND SMOLIN’S SYSTEM

Unger and Smolin have presented a powerful natural philosophy which, in a philosophical era dominated by skeptical democratic materialism, is impressively systematic and ambitious. It would be impossible to fully examine all their nuanced arguments and positions in one paper.<sup>41</sup> Here, I will simply be looking at how Unger

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<sup>38</sup> See Unger. “A Mystery Demystified,” 1.

<sup>39</sup> See Smolin. *Time Reborn*,

<sup>40</sup> See Smolin, *Time Reborn*, 54-55

<sup>41</sup> One of the most noteworthy areas where I can offer criticism is their attempt to deal with the paradox of meta-laws. It would seem that Unger and Smolin’s argument that all laws evolve can be subjected to an obvious criticism. Their position seems fundamentally paradoxical, as they put it, because one might ask whether it is an eternal natural law that the emergence of natural laws is contingent. To their credit, Unger and Smolin are aware of this difficulty, connoting it as the meta-law paradox. Their contention is that the paradox becomes less significant once one accepts the Darwinian inspired fact that their approach is probabilistic rather than deterministic. This suggests that there is always a causal relationship between past and future in a universe where time is real, but it is never so wholly determined that we are pushed back to assuming that time is an illusion. As put by Unger “What we call laws of nature are the regular and recurrent form that causal connections take in certain states of nature or for certain periods in the history of the universe. It follows that we do better to think of the laws of nature as deriving from causal connections rather than to see the latter as deriving from the former, as we are accustomed to do. The existence of causality without laws is founded on the power of sequence: the influence of a before on an after. It is an influence exercised regardless of whether causal processes recur over a differentiated structure of reality, allowing us to state laws in the form of equations. The ability to express laws of nature as equations provides an immense benefit to scientific inquiry. By the same token, however, this practice may mislead us into thinking of causal connections as mere instances of laws of nature. It is, on the contrary, the laws that describe one of the forms, but not the only form, that causal connections take in nature: the recurrent and general form.” In Unger and Smolin, *The Singular Universe*, 281. Unfortunately, we do not find this fully satisfactory. For once, it only applies to reality at the cosmological scale without accounting for whether

and Smolin deepen their anti-Platonism by dismissing the need to develop a rigorous mathematical account of the infinite. I believe that this is an error. Any ontologically rigorous account of reality must ultimately find a way to account for the infinite, both in its mathematical formulations and as it appears in nature.

Unger and Smolin take the neo-Gaussian<sup>42</sup> position that the infinite is essentially a heuristic term without actual substance. They juxtapose this against the Platonism of physicists such as Roger Penrose who ascribe the infinite a fundamental, but distinct, reality which we can only perceive but only dimly.<sup>43</sup> While mathematicians and physicists might be dealing with immense and even indefinitely large quantities, they do not believe we should ascribe any significance to infinity beyond that required to do the practical work of everyday science. This applies both to cosmological phenomena such as singularities, which are often considered bodies of infinite mass and density, and to “inventions” such as Cantor’s system of transfinite numbers.<sup>44</sup>

I do not believe this pragmatic argument is adequate. Cantor’s development of the theory of transfinite numbers is not simply a novel invention with some useful applications. It fundamentally transforms our approach to issues where infinity is at play, by giving us a more analytically rigorous means of understanding these deeply ephemeral concepts. Cantor’s great discovery was to formulate an analytically rigorous distinction<sup>45</sup> between what he referred to as the potential and the absolute infinite.<sup>46</sup> A potentially infinite “number” was a logical quantity which one could demonstrate had no definable

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the same applies in mid-level tiers of reality, such as the one we human beings inhabit. This is part of the reason we feel a transcendental empiricism as found in Schelling is required. At a deeper level, it also does not account for more basic problems about holism and reductionism, and its relationship to the necessity and determinism Smolin and Unger reject. For example, I believe that Saul Kripke makes salient points in maintaining that it seems necessary for certain objects to have essential characteristics *a posteriori* for them to exist as what they are. The famous example is the chemical structure of water a dihydrogen monoxide. Whether these objections can be levelled more systematically against them is a question I leave for another time. See Saul Kripke. *Naming and Necessity*. (Singapore: Blackwell Publishing, 1981), 128-129. See also Arif Ahmed. *Saul Kripke: Contemporary American Thinkers*. (New York: Continuum, 2007).

<sup>42</sup> Carl Gauss claimed he would “protest against using infinite magnitude as something consummated; such a use is never admissible in mathematics. The infinite is a *façon de parler*; one has in mind limits which ratios approach as closely as desirable, while other ratios may increase indefinitely.” This quote may be found in John D. Barrow. *New Theories of Everything*. (New York: Oxford University Press, 2007), 46.

<sup>43</sup> See Penrose. *The Road to Reality*, 1028-1029.

<sup>44</sup> See Unger and Smolin, *The Singular Universe*, 440

<sup>45</sup> In the concluding section of the paper this distinction becomes quite important.

<sup>46</sup> Georg Cantor. *Contributions to the Founding of the Theory of Transfinite Numbers*, trans. Phillip Jourdain. (New York: Dover Press, 1955)

limit.<sup>47</sup> None the less, one could paradoxically also establish that there were still larger quantities than that potentially infinite number if it was put into one to one correspondence with another potentially infinite number. This continued up to what he called the “Absolute infinite,” which he largely ascribed the theological qualities that some philosophers<sup>48</sup> had long associated with infinity.<sup>49</sup>

Cantor knew that he was defending logical concepts which were paradoxical and which upset our settled understanding. How could a quantity that was infinite none-the-less exist in a world with a quantity that exceeded it? This is why he attempted to temper the problem and ameliorate skepticism by critics through drawing a qualitative distinction between what he called the potential and the Absolute infinity.<sup>50</sup> To talk about a potential infinity simply involved...

“...say[ing] that there are infinitely many objects of a certain kind ('infinitely' being taken in the syncategorematic sense) simply means that given any finite number of these objects there will be some larger number of them.”<sup>51</sup>

I believe that Cantor hoped to ground the logic of the potential infinity in the more palatable argument that it was of a unique type finitude. The potential infinity was a magnitude greater than any finite number that could be thought.<sup>52</sup> In this sense, I consider it to be a transcendental hypothesis' Cantor understood that after a threshold these indefinite quantities take on qualitatively distinct characteristics relative to other numbers. Therefore, he considered the hypothesis that there existed an absolute infinite to be a central to understanding the potential infinite. After a point, one could no longer rely on logical analysis. One had to engage in the transcendental task of bringing

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<sup>47</sup> In his earlier work Cantor preferred to characterize potentially infinite numbers as "transfinite" to avoid confusion. Because the concept of potentiality has a longer history in the philosophical literature I have chosen to use this term instead.

<sup>48</sup> Schelling was no exception to this as we shall see.

<sup>49</sup> Jane Ignacio. “The Role of the Absolute Infinite in Cantor’s Conception of Set.” *Erkenntnis* 42 (1995): 383. The point against the “finitist response” is also made by Mary Tiles by appealing to the continuum problem. See Mary Tiles. *The Philosophy of Set Theory: An Historical Introduction to Cantor’s Paradise*. (New York: Dover, 1989), 64-67.

<sup>50</sup> Some of this history, and Cantor's rivalry with Leopold Kronecker, is recounted in David Foster Wallace's book on infinity. See David Foster Wallace. *Everything and More: A Compact History of Infinity*. (United States: Norton, 2003), 170.

<sup>51</sup> Jane Ignacio. “The Role of the Absolute Infinite in Cantor’s Conception of Set.” *Erkenntnis* 42 (1995): 383.

<sup>52</sup> By contrast, Cantor regarded the Absolute infinity as a unity rather than just another magnitude and denoted it with the Omega symbol  $\Omega$ . A deeply religious man, he came to associate it very closely with a personalized God.

definite and indefinite quantities into some holistic system of understanding; both epistemologically<sup>53</sup> and ontologically.<sup>54</sup>

Unger and Smolin conceive of the infinite as essentially a heuristic term; one with some use but without actual substance. Their reasoning applies both to cosmological phenomena that have typically been understood to involve infinite quantities related to mass and density, and to mathematical “inventions” such as the system of transfinite numbers. While they offer some reasons for their position, none of them are particularly convincing. Most involve simply trying to tame the infinite by suggesting that it is little more than a pragmatic tool that cannot be connected to any empirical object.

This position seems rather obscure. Firstly, it seems clear that since at least the 19<sup>th</sup> century the infinite cannot be conceptually pragmatized in the way Unger and Smolin want. Their account might have been true of the more transcendental accounts given by scholars like Kant, who did indeed use the infinite in a manner akin to a heuristic device. But in a post-Cantorian world, we have developed considerably more rigorous interpretations of the infinite and the problem of the continuum that aren’t so easily pushed aside. This brings me to my second point. Unger and Smolin might be able to avoid this issue if it were just a matter of mathematical interest. But the mathematics of the infinite does pertain to important issues in physical theory, a point which has been acknowledged by other philosophically minded physicists such as Roger Penrose who points to its necessity when interpreting Hilbert Spaces in his book *The Road to Reality*.<sup>55</sup> This is just one example of many that could be raised, but Unger and Smolin seem largely disinterested in engaging this issue in a comprehensive way.

This suggests that Unger and Smolin’s anti-mathematic disposition might be less steady than they claim. Indeed, at some points Unger and Smolin’s anti-Platonism comes across as doctrinaire. How this might problematize their philosophy of nature more generally, I leave to the reader. To give just one example that comes to mind, it remains unclear to me how Unger and Smolin can successfully answer some of the classical cosmological antinomies, such as whether the universe had a beginning or not in time, without wrestling more deeply with these matters. Determining whether the universe had a beginning or end necessarily involves questions of the finitude or not of time, and any answer they provide is unlikely to be convincing without a more thorough

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<sup>53</sup> Here, he is occasionally more rigorous than Smolin and Unger, who occasionally let their ambitions run ahead of what they can establish conclusively. While this is occasionally admirable, one cannot avoid epistemic niceties exclusively by appealing to the grandiose.

<sup>54</sup> Ironically, I feel that this step, in keeping with the demands of practical reason, is closer to the spirit of Unger and Smolin’s project than simply dismissing the infinite wholesale.

<sup>55</sup> Penrose, *The Road to Reality*, 917

engagement with the infinite.

Another question raised that is less directly obvious is how Unger and Smolin would relate their philosophy of nature to other scientifically and philosophically interesting phenomena. This is important since a philosophy of nature must, by definition, account for all that naturally emerges. This means that Unger and Smolin must be able to extend the parameters of their thinking to account for features of the world like consciousness; the study of which draws in part from the mathematics of the infinite. Ironically, in his *Pragmatism Unbound*,<sup>56</sup> Unger references the linguistic theories of Noam Chomsky<sup>57</sup> to give weight to his argument that human consciousness has a creative capacity to transcend social determination. But Chomsky's linguistics depends heavily on Cantorian insights about the infinite, particularly in his arguments about semantic novelty. Chomsky believes that human consciousness can articulate a potentially infinite number of novel sentences, and analyses this using the tools provided by the mathematics of infinity. This is also Penrose's tactic in the more Gödel inspired work, *The Emperor's New Mind*.<sup>58</sup> Both these accounts of consciousness rely on mathematical insights about infinite to show how our mind is not entirely determined by external reality, and it is unclear how Unger can make a similar argument without relying on mathematical analogous tools.

These points demonstrate that Unger and Smolin have inadequately addressed the problems posed by the infinite. This is especially problematic when a rigorous understanding is necessary if we are to account for how useful infinite quantities are becoming in understanding phenomena such as consciousness, language use, and to address antinomies about the origins of the universe. Unger and Smolin ascribe the mathematical infinite far too little significance. I do not believe that this approach is appropriate given the magnitude of the problem. That is why, in the subsequent sections, I will look at whether Schelling provides us with some of the philosophical resources we need to more rigorously approach these highly speculative problems.

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<sup>56</sup> Roberto Mangabeira Unger. *The Self Awakened: Pragmatism Unbound*. (Cambridge: Harvard University Press, 2009)

<sup>57</sup> Chomsky references Humboldt's quote in several different works. See Chomsky. *Language and Problems of Knowledge: The Managua Lectures*. (Boston: MIT Press, 1988). Interestingly, Penrose makes a similar transcendental point (though he does not call it that) in his account of the creative aspect of the human mind, which allows it to grasp "Platonic" realities such as the infinite in a peculiar way. See Penrose. *The Emperor's New Mind*

<sup>58</sup> Penrose, *The Emperor's New Mind*

## Part II

### STEPS TOWARDS A SCHELLINGIAN RECONCILIATION

Thus far, I have argued that Roberto Unger and Lee Smolin developed an impressive and systematic philosophy of nature which is ultimately unconvincing. This is due to their inadequate treatment of the infinite, and its application to understanding phenomena like the powers of human consciousness and certain classic problems about time and the origins of the universe.<sup>59</sup>

This demonstrates the need to look for other philosophical resources to develop a more comprehensive philosophy of nature. Schelling's early and middle philosophy can offer many of the conceptual resources needed to resolve some of the problems highlighted above. This is because Schelling had a clear grasp on the paradoxes of the infinite, how consciousness attempts to mediate them, and how to reconcile these problems within a systematic philosophy of nature.

This is not to suggest that the account given is a systematic application of Schelling's work. Indeed, I approach his philosophy of nature with a fair degree of latitude. This is in part because it is often unclear how Schelling's positions, expounded over several works, are meant to fit together. Given this, approaching his work systematically would be unhelpful. I think it is more useful to understand Schelling as wrestling with a consistent set of philosophical problems, rather than primarily developing a methodological approach which begets a specific set of philosophical solutions to be applied in all situations. Schelling's attempts to deal with diverse philosophical problems, and even the occasionally frustrating variety of answers he presents, can be extremely helpful in developing a philosophy of nature that avoids the problems which befall

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<sup>59</sup> In many respects, Unger and Smolin's account falls victim to a problem that besets those ontologies which place absolute emphasis on contingency over necessity as animating principles in the formation of ontological structures. A good contemporary example to place alongside Unger and Smolin's philosophy of nature would be Quentin Meillassoux's. In his *After Finitude*, Meillassoux argues for an anti-Ptolemaic revolution in philosophy which would efface the impact of the Kantian revolution, and restore mathematics—contra Unger and Smolin—to pride of place as the language of ontology. Following Badiou, Meillassoux argues that a proper understanding of the mathematical structure of reality reveals the radical contingency of the all natural and even logical laws which emerge. See Quentin Meillassoux. *After Finitude: An Essay on the Necessity of Contingency*, trans. Ray Brassier. (London, UK. Continuum, 2010)

proposals like Unger and Smolin's.

Schelling's early and mid period philosophy wrestles with two related problems. The first is to account for the nature of human consciousness. The second is to account for the system of nature which produced consciousness,<sup>60</sup> and to describe the relation between the two.<sup>61</sup> These two problems can be presented as a paradox: while one can only understand nature through the tools of consciousness, at the same time, one cannot fully grasp the nature of consciousness without accounting for the natural world which produced it.<sup>62</sup>

For our purposes, the latter is more important, as it is where Schelling provides the most useful philosophical resources for developing a robust philosophy of nature which goes beyond mere scientism. As nicely summarized by Jared McGeough:

“Nonetheless, the overall purpose of Schelling's *Naturphilosophie* was less to explain how nature itself functioned than ‘to allow natural science itself to arise philosophically’ (Schelling, 1988: 5)—that is to say, to provide the philosophical or metaphysical framework through which the sciences are pushed beyond their own positivity.”<sup>63</sup>

When discussing how Schelling “allows natural science itself to arise philosophically” it makes sense to begin by discussing his account of consciousness; the human organ which interacts with and apprehends scientific phenomena. In his *System of Transcendental Idealism*, Schelling develops a complex account of an infinite conscious “I” and how it relates to the world. He maintains that consciousness is infinite because it comes to recognize its own status as Absolutely free through being able to will its own causality. Consciousness is able to bring novelty into the world in a manner that is not determined by anterior natural laws, and is thus a creative and free being. This reconciles some of the antinomies posed between being a thinking subject and existing as a natural object. In Kantian terms,<sup>64</sup> Schelling's system of transcendental idealism shows us how infinite

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<sup>60</sup> See Schelling, *System of Transcendental Idealism*, 219-233 and Schelling, *First Outline*, 193-194

<sup>61</sup> See Schelling, *System of Transcendental Idealism*, 212-214

<sup>62</sup> My reading here draws in part, from Zizek's comparison between Schelling and Heidegger on freedom and Being. See Slavoj Zizek. *Less Than Nothing: Hegel and the Shadow of Dialectical Materialism*. (London: Verso Press, 2012), 886-890. According to Zizek, Heidegger saw Schelling as giving an account that moved beyond Kant's transcendental schematic and enabling us to start asking questions on fundamental ontology. Of course, they came to radically different conclusions. For Heidegger's approach to these problems see Martin Heidegger. *Kant and the Problem of Metaphysics; Fifth Edition (Enlarged)*, trans. Richard Taft. (Indianapolis: Indiana University Press, 1997), 162-173.

<sup>63</sup> See Jared McGeough. “Three Scandals in the Philosophy of F. W. J. Schelling: Ontology, Freedom, Mythology.” *Anarchist Developments in Cultural Studies*, 2, (2013), 146.

<sup>64</sup> See Immanuel Kant. *Critique of Judgement*, trans. James Creed Meredith. (Oxford: Oxford University Press, 2007)

consciousness operates within historical times as a teleological unity between necessity and freedom through willing its own necessity.<sup>65</sup>

But at this point, the infinite willing consciousness comes to recognize a problem. Despite the power it possesses through freedom, infinite consciousness remains constrained by its inability to explain the ground of its own individual being. Gradually, consciousness recognizes the reductive problem: it can only solve this problem by explaining the ground of all Being within time. In the *System of Transcendental Idealism*, Schelling felt that this reductive problem was insolvable, and that infinite consciousness could never grasp the even greater infinite nature which was beyond it. The best consciousness could do was to express these sublime thoughts in art, and therefore mediate the paradox of being a potentially infinite subject within the absolute infinite of nature.<sup>66</sup> This somewhat proto-existential answer might superficially seem disappointing at first glance; especially for those of us interested in the philosophy of nature. Fortunately, in his directly works on the philosophy of nature Schelling supplies us with useful philosophical tools to develop a more robust account of the ground of being.

In nature Schelling confronts a problem comparable to that confronting infinite consciousness. This is that the beings of this world can only be accounted for by something both external to themselves in geometrical space, and prior to themselves within time. The ultimate grounding of Being Schelling called the Absolute. How the Absolute was to be understood in Schelling remains a point of contention.<sup>67</sup> But it seems clear that it is intended as something quite different from the stereotypical Hegelian Absolute Idea,<sup>68</sup> where all differences become effaced in the unity of the one.<sup>69</sup> Instead of existing as the teleological end—a unity in which all difference is effaced— from the start the Absolute is immanently alienated from itself.<sup>70</sup>

I think the simplest way to characterize this alienation is as a struggle between necessity and contingency. The Absolute operates according to a necessitarian and

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<sup>65</sup> See Schelling, *System of Transcendental Idealism*, 203-211

<sup>66</sup> See Schelling, *System of Transcendental Idealism*, 217-218

<sup>67</sup> For an interesting account see S.J McGrath. “Is Schelling’s Nature Philosophy Freudian?” *Analecta Hermeneutica*, 3, (2011)

<sup>68</sup> See Georg Hegel. *Logic: Being Part One of the Encyclopaedia of the Philosophical Sciences*, trans. William Wallace. (UK. Clarendon Press, 1975), 324

<sup>69</sup> Very few Hegelians still understand the Absolute in this way. I do not think that is correct either. But to illuminate by contrast I choose to raise the spectre of vulgar Hegelianism.

<sup>70</sup> This account is characteristic of Schelling’s thought, where natural antagonisms which confront one another engage in a productive set of relations which beget transformative processes, but are never resolved with any finality. This is in sharp contrast to vulgar Hegelianism.



eternal-one might say Platonic-logic, but struggles to elevate itself to a more conscious and free position by enacting contingent processes, par Unger and Smolin, within time.<sup>71</sup> Put more theosophically, for Schelling God as nature is immanently self-alienating, for it is self-alienation which is the most basic ground for the emergence of novelty.

“In Schelling's Absolute there is a dark, irrational ground, which has to be purified, developmentally, ere Personal Being is reached; there is for him something in God which may, no doubt, become God, but is not God. God must have the ground of existence within himself, says Schelling, since nothing exists before or without God; but Schelling does not take this ground to be God, absolutely considered, that is to say, in so far as He exists. But if the world were taken, he says, to be different from God, then would the world have arisen from a ground different from God; but, as nothing can exist outside the Absolute, the solution of the contradiction is to be found, in his view, in the world having its ground in that original ground which is also the ground of the Divine Existence. This ground -or absolute potency -cannot be resolved, but remains as the ground, "the incomprehensible basis of reality."<sup>72</sup>

Later, Schelling would go on to give this claim a more overtly moral<sup>73</sup> cast in his profound analysis of human freedom.<sup>74</sup> But in the early philosophy of nature, his treatment is more descriptive. The Absolute comes into greater self-consciousness, and thus more power, through its process of self-alienation wherein the static necessity of natural determinism gives way to the contingency of what Schelling will famously call the potencies.

This is how Schelling takes the natural world to have emerged as a dynamic process wherein individuated objects, and indeed conscious and free subjects, emerge out of a self-alienating Absolute unity.<sup>75</sup> Over the course of time, the natural world comes to exist as instantiated sets of externalized relationships that are dynamic and open to contingent transformations in which novelty appears. These instantiations of the Absolute as a set of dynamic relations Schelling called the “potencies.”<sup>76</sup> The individual potencies which emerge in the world as instantiations of the Absolute ground of Being are each of equal ontological necessity, but within any given moment of time one potency may dominate

<sup>71</sup> See Schelling, *First Outline*

<sup>72</sup> See James Lindsay. “The Philosophy of Schelling.” *The Philosophical Review*, 19, (1910), 267.

<sup>73</sup> Interestingly, Unger and Smolin are also prone to drawing moral inferences about human freedom from their account of nature. As highlighted, there are clear connections drawn between overcoming false necessity in human social relations and recognizing the false necessity of determinate natural laws.

<sup>74</sup> See FWJ Schelling. *Philosophical Investigations Into the Essence of Human Freedom*, trans. Jeff Love and Johannes Schmidt. (Albany, NY. State University of New York Press, 2006)

<sup>75</sup> Schelling's account of how objects emerge specifically remains somewhat vague to me.

<sup>76</sup> See Schelling, *First Outline*, 33.

or subsume a myriad of others through a transformative process. This creates emergent patterns within nature, wherein phenomena occur and time makes itself manifest to consciousness. To invoke Unger and Smolin, these patterns will seem to assume a law governed character for consciousness, though the given legal regime lasts only so long as one potency is dominant.

In his *Philosophical Investigations Into the Essence of Human Freedom*, Schelling deepens many of these early claims while deviating from them in other important respects. In the *Philosophical Investigations* Schelling attempts to show how the conscious subject recognizes that as nature itself is capable of contingently generating novelty, so to are all human beings capable of freedom as a potentially infinite consciousness.<sup>77</sup> This is in contrast to figures like Spinoza,<sup>78</sup> who Schelling believes developed too static and deterministic an account of nature, consciousness, and the relation between them.<sup>79</sup> Schelling recognizes that the human being and nature share in the potentially infinite capacity to generate novelty in a manner which is grounded by necessity but cannot be explained or determined entirely by it. This pushes the more inert aspect of an individuated potency back to instantiate itself in a dynamic process of engaging in transformative external relations. In this way, potentially infinity capacity of nature's potencies and human beings to generate novelty begets contingency in the world.

But this comes at a price. The capacity to generate novelty is a potentially, rather than Absolutely, infinite capacity. This means that both conscious beings and the potencies of nature will always be engaged in an active process involving self-alienation through engaging in transformative external relations.<sup>80</sup> There will never come a point when all infinite potentialities will be realized. Human beings and nature will never reach a state of perfection in an inalienable Absolute where all potencies come to rest in static harmony with one another.<sup>81</sup> Various potencies may well dominate nature at given times, as various drives may dominate the consciousness of human beings. But none will ever subordinate all other potentially infinite potentialities for the rest eternity. Indeed,

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<sup>77</sup> Later, he seems to further humanize this intuition by ascribing an approximate function to human mythology. I do not feel he was correct to take this step. See F.W.J Schelling. *Historical-critical Introduction to the Philosophy of Mythology*, trans. Mason Richey and Markus Zisselsberger. (New York: State University of New York Press, 2007)

<sup>78</sup> See Benedict de Spinoza. *Ethics*, trans. Edwin Curley. (London, UK. Penguin Books, 2005)

<sup>79</sup> See Schelling. "Philosophical Investigations," 12-13.

<sup>80</sup> There are some senses here in which potentiality seems to have a kind of virtual existence. I will develop this point further in the last section.

<sup>81</sup> As noted by McGeough, this might well be interpreted in radical political directions. See McGeough "Three Scandals in the Philosophy of F. W. J. Schelling Ontology, Freedom, Mythology."

Schelling seems to regard such a possibility as tantamount to death.

I hope the reader can see the attractions of this line of argument. Schelling's thought enables us to think through the links between the potentially infinite consciousness of the subject and their relationship with an Absolute infinite nature that manifests itself as potencies. Moreover, Schelling's thought helps us see how nature can consist of potencies which simultaneously generate regular natural laws at any one moment while a given potency is dominant, while the interplay of all potencies over time produces real change. I believe this retains the best features of Roberto Unger and Lee Smolin's philosophy of nature while going beyond it in important ways. It relies heavily on a transcendental account of infinite quantities, and ascribes them actual ontological significance.<sup>82</sup> In this way it keeps aspects of the Platonic emphasis on mathematics that are valuable. But at the same time Schelling's philosophy of nature does not relegate the actual operations of nature to the ephemeral realm of illusion, while focusing exclusively on the operation of eternal laws. It therefore addresses Unger and Smolin's concerns about physicists and natural philosophers focusing excessively on the eternal rather than the temporal.

To put it in the language of Unger and Smolin, Schelling believes that time does exist in the strong sense of the word. This is because nature's laws do evolve and transform through the interplay of potencies. But where Schelling goes beyond Unger and Smolin is his argument that even such a non-totalizing vision is dependent on considering the ground of all nature itself, an Absolute infinite that remains in contradiction to our existential experience of reality.<sup>83</sup> The process of this Absolute is to be continuously self-alienating, wherein the instantiation of potencies results in their coming into relation with one another and generating novel patterns in nature. There is no point where nature ceases to be a process and becomes holistically one again with its fundamental Idea<sup>84</sup> in the Absolute. The Absolute immanently constitutes nature through self-alienation, and nature in turn enables the deeper development of the absolute. It is the task of philosophers to think through these complex features of the philosophy of nature without reducing either the self without reducing nature to its mere appearances. A philosophy of nature must be far more sensitive to the richer and deeper process which occurs beneath the superficial sheen of such appearances.

This concludes my brief discussion of Schelling's philosophy of nature. I believe that there is much which can be profitably mined from these speculations. However, as it

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<sup>82</sup> See Schelling, *System of Transcendental Idealism*, 155. Here Schelling discusses how the self becomes open to the infinity that is its creative freedom within nature.

<sup>83</sup> See Schelling, *System of Transcendental Idealism*, 215-218

<sup>84</sup> The language here is Hegelian. See Hegel, *Logic*, 392.

stands now, their contemporary application remains unclear. While Unger and Smolin have elaborated on the relationship of their philosophy of nature and contemporary physics, Schelling wrote centuries ago and much work remains to be done in updating and applying his philosophy to contemporary problems. In the concluding section, I will present a reconstruction of the Schellingian ideas presented here alongside some of my own. I will also suggest how these either supplement or run counter to those presented by Unger and Smolin.

### CONCLUSION: GOING BEYOND SCHELLING

In this paper we have looked at two philosophies of nature: the contemporary proposal developed by Unger and Smolin and presented in *The Singular Universe*, and Schelling's eclectic philosophy of nature as presented in multiple different works. I argued that, for all its innovations, Unger and Smolin's philosophy of nature was beset with significant problems, especially its treatment of the infinite. By contrast, Schelling's does not suffer from the same deficiencies, and offers a rich set of philosophical resources to develop a more robust philosophy of nature.

In this concluding section, I will try to develop this position more programmatically. The key point I wish to highlight is the relationship and tension Schelling draws between an infinite conscious being and the even more infinite world that exists beyond it. This point is the source or rich philosophical insight for Schelling, and maps neatly onto Cantor's distinction between the potential and the Absolute infinite; with the former operating as a continuum and the latter serving a more or less religious function analogous to the Absolute in classical thought. Unger and Smolin are mostly dismissive of these issues due to their anti-Platonism. Following Schelling, I think there is a lot more to be gleaned here than meets the eye.

There are two natural phenomena Schelling is better able to account for which demonstrate the power of his system relative to Unger and Smolin's. These relate back to the two problems he was concerned to deal with throughout his philosophy. The first is the problem of an infinite consciousness and its relationship with nature. The second is the problem of nature itself.

To the first, I think that Schelling's philosophy of nature gives us a far more robust understanding of the power and nature of consciousness than would be possible on Unger and Smolin's proposal. Schelling understands human beings to be novelty generating; they bring contingency into the world. As highlighted before, there seem to be good reasons to believe this is indeed what human beings do. A good example is the way we continuously generate sentences which are semantically novel and have never been articulated in the world before. This is referred to as semantic novelty by Noam

Chomsky.

Chomsky has often approvingly cited Humboldt's claim that language involves the "infinite use of finite means."<sup>85</sup> To understand how this is so, one must momentarily turn back to Cantor's logical argument about the potential infinite, which formed the basis for Chomsky's own investigations into the logical structure of what he later referred to as generative grammar. Chomsky relied on Cantor's discoveries to demonstrate how a language could both be indefinitely capable of new growth while at the same time never reaching a point where one could speak of a set of all possible statements. It also helped explain how individuals can continue to deploy language creatively even in semantic communities with long histories or limited members. Chomsky's discovery constitutes the corollary of Cantor's own pioneering discoveries.

The logic of Cantorian mathematics was foundational to Chomsky's project. Chomsky argued that empiricist theories of language could not account for how languages grow and evolve; how novelty can emerge in other words.<sup>86</sup> Chomsky argued that languages change because most statements, (excepting certain colloquialisms such as hello and goodbye), are semantically novel. This means that they have never been made by a speaker before. Chomsky claims that the semantic novelty of most statements results from what he calls the "creative aspect of language." The creative aspect of a language demonstrates how individuals continuously invent and play new "games" with their semantic inheritances.

Chomsky's account of the semantic novelty echoes Schelling's far earlier accounts of an infinite consciousness interacting with an even larger world. Notably, Schelling saw this interaction as a productive one that never reached a conclusion. As mentioned, consciousness always possesses the potentially infinite capacity to bring about novelty, but never reaches a point where full reconciliation with the Absolute takes place. In the same way, Chomsky demonstrates how language users will continuously produce an endless variety of novel sentences without ever exhausting or running up against the limits of their language. There will always be something new to say, and our consciousness and engagement with the world ensures that we will always take advantage of this.

This brings me to the second point I would like to make about the explanatory power of Schelling's philosophy of nature. Schelling provides the theoretical resources to better understand a conscious human being's potentially infinite capacity to bring novelty into

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<sup>85</sup> Chomsky references Humboldt's quote in several different works. See Chomsky. *Language*, 213

<sup>86</sup> Contra Unger and Smolin, Chomsky also refers to this as a Platonic idea. See Noam Chomsky. *Selected Readings on Transformational Theory*. (London, UK: Dover Books, 2009), 135.

the world. But I think we can follow him further and apply this insight more comprehensively to nature itself. This is where Schelling can better enable us to develop a more robust and modern philosophy of nature. In much the same way as consciousness has an infinite capacity to generate novelty, so to do nature's potencies continuously relate to one another and bring about novel physical phenomena; including novel physical laws. But, for Schelling, this process is itself determined by a deeper relationship to the Absolute which is analogous to the relationship Cantor drew between the potential and the Absolute infinite.

I think the best way to understand and update Schelling's proposals on the philosophy of nature is to see nature as he did; fundamentally complete in one respect but self-alienating in another. I do this by dividing nature into two fundamental dimensions, which mostly correspond to Schelling's Absolute and the natural world established by the interaction of the potencies. These two dimensions interact with one another through a transformative process wherein the eternal infinite laws of mathematics beget novel features and laws in nature.

To put this in updated terminology we might call the first dimension of reality the Absolute infinite. This Absolute infinite is the eternal set of all possible instantiations of the potencies of nature which might potentially emerge in the transformational process of novelty generation over time.<sup>87</sup> It operates according to a Platonic logic<sup>88</sup> determined by the mathematical rules sketched out by Cantor, and reintroduced to continental philosophers by Badiou and Meillassoux amongst other thinkers.<sup>89</sup> But it is important to note that its existence is virtual, in the sense that it is purely the set of all possible instantiations. The Platonic logic does not determine which instantiations will appear since this is dependent on the interactive process the potencies engage in over time.

Then there is the dimension of potentiality. There are the potentially infinite number of instantiations which do occur in concrete fact, and which constitute the sequence of events we perceive in real time. These instantiations have a virtual existence as potential material events within the eternal set of all possibilities, until the contingent relation of potencies instantiate in a particular way as concrete, novel events in the world of time. As these material events unfurl, we come to perceive the succession of them as "time." The process moves us from the Absolute infinite set determined by a Platonic

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<sup>87</sup> Following Bohm, we might call this a theory of an implicate order, which explicates itself in the course of time. See David Bohm. *Wholeness and the Implicate Order*. (London, UK. Routledge Press, 1980). Unlike Bohm however, I do not think reality is a "whole" in the sense of being Absolutely complete. This is where the distinction between dimensions, inspired by Schelling, becomes important.

<sup>88</sup> *This echoes Penrose's point*. See Penrose. *The Road to Reality*, 1028-1029.

<sup>89</sup> See Badiou. *Being and Event*, and Meillassoux, *After Finitude*

logic of mathematical rules, to the virtual realm of potential events, and finally events which occur in concrete fact as natural potencies relate in novel ways. Throughout the process, the level of sophistication and complexity in nature continuously increases in a manner analogous to how consciousness generates novel sentences which enrich a language.

Following Schelling, and indeed Unger and Smolin on this point, I think it is important to highlight that this process is never ending and open ended. Novelty is continuously being introduced into the world, sometimes in the form of novel physical laws. But where Schelling is more sophisticated than Unger and Smolin is in the dynamic nature of his natural ontology. He recognizes that there are what I have called multiple dimensions to reality, such as the alienated Absolute and its potencies, rather than trying to reduce it to a kind of ontological univocity par Unger and Smolin. I've chosen to update Schelling's account here by casting it in terms of an Absolute and potential infinite, which are two interactive dimensions of reality. I feel such a Schellingian account offers a more robust philosophy of nature than can be found in the work of Smolin and Unger, though it draws on their more important insights.

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